

EXHIBIT 1**BRIEF BIOSKETCH**

Dr. Jan Holmgren, MD, PhD is Professor and Head of the Department of medical microbiology and immunology at Göteborg University, Sweden, a chair he took over in 1980 after Prof. Örjan Ouchterlony; he is also Director of the Göteborg University Vaccine Research Institut (GUVAX) created in 2001. JH has published almost 500 papers in the fields of microbiology, immunology and vaccinology, and he is an elected member of various societies and academies including e.g. the Swedish Royal Academy of Science (Medicine class) and the Royal Academy of Engineering (Biotechnology class). He has also served on many national and international boards. Currently, he belongs to the Board of Directors of e.g. the Knut and Alice Wallenberg Foundation (Sweden) and the International Vaccine Institute (IVI), and he is also a member of various vaccine-related technical task forces or steering committees for e.g. the Global Alliance for Vaccines and Immunisation (GAVI), the DOMI program of IVI and the World Health Organisation (WHO).

Scientifically, after completing his PhD thesis on urinary tract infection immunology in 1969, a large part of JH's research has been focused on the mechanisms of disease and immunity in cholera and other mucosal infections and on the development of mucosal vaccines. In his early work on cholera, JH discovered, for instance, the AB subunit structure and function of cholera toxin and also GM1 ganglioside as the cholera toxin receptor. In the field of vaccines, JH and coworkers have over the past 20 years made many important contributions in mucosal immunology and the development of mucosal vaccines. They have developed and taken the oral B subunit-whole cell cholera vaccine all the way from basic concept to an internationally widely registered product, they have developed and taken an oral ETEC vaccine from concept to phase 3 trials, and they have pioneered the development of methods for assessment of mucosal vaccine immunogenicity in humans. In more basic aspects of mucosal vaccinology, the Göteborg laboratory has made important contributions in mucosal adjuvant construction, in defining basic mechanisms of mucosal immune regulation, and recently also in developing promising mucosal immunomodulating/tolerogenic vaccine therapies against autoimmune and allergic diseases based on the use of cholera toxin B subunit for inducing tolerance to chemically or genetically conjugated tissue antigens or allergens. JH and his laboratory are extensively involved in collaborations with many international medical and vaccine research institutions and programs including e.g. IVI and its DOMI program, WHO, GAVI, and ICDDR,B (Bangladesh).